A LECTURE NOTE
ON
TH 2- STRENGTH OF MATERIAL
SEMESTER -3

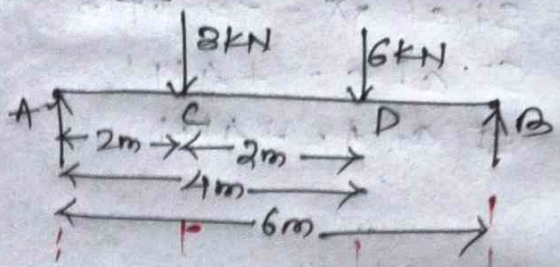
Prepared by – Miss. Sharmila Sabar

Sr. Lecture Mechanical Engineering

Mechanical Engineering

GOVT. POLYTECHNIC, MALKANGIRI

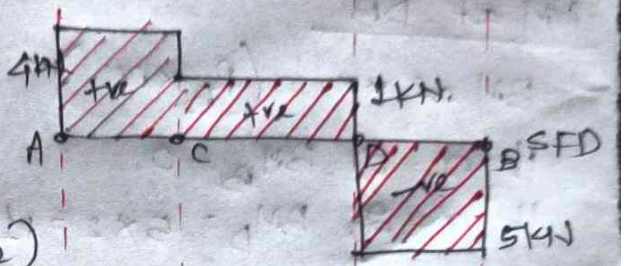
Simply Supported Beam Carrying Unit/Point load:-



All upward force is equal to all downward force

$$R_A + R_B = 3 + 6$$

$$R_A + R_B = 9\ KN \longrightarrow \langle 1 \rangle$$



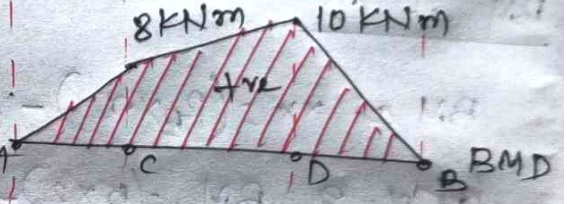
Taking moment about A,

$$M_A = (R_B \times 6) - (6 \times 4) - (3 \times 2)$$

$$= 6R_B - 24 - 6$$

$$6R_B = 24 + 6 = 30$$

$$R_B = 30/6 = 5\ KN \longrightarrow \langle 2 \rangle$$



By putting the value of R_B from eq^n $\langle 2 \rangle$ in eq^n $\langle 1 \rangle$ we get

$$R_A + 5 = 9$$

$$R_A = 9 - 5 = 4\ KN \longrightarrow \langle 3 \rangle$$

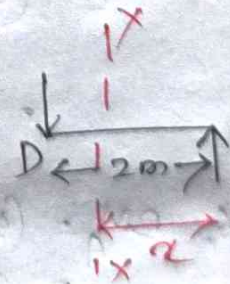
So $\boxed{R_A = 4\ KN \text{ & } R_B = 5\ KN}$

SF at point DB

SF at XX $= -5$ KN

SF at B $= -5$ KN

SF at D $= -5$ KN.

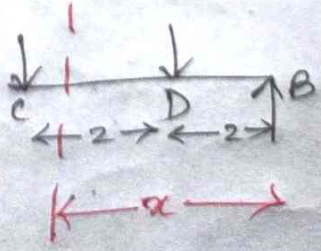


SF at point CD

SF at XX $= -5 + 6 = 1$ KN

SF at C $= 1$ KN

SF at D $= 1$ KN

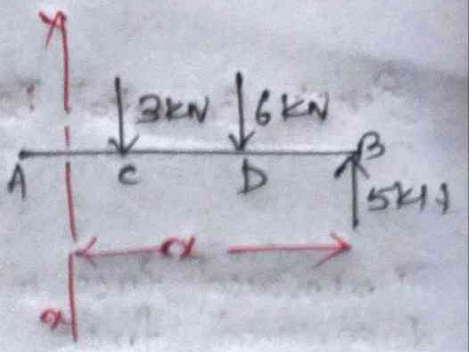


SF between AC

SF at XX = −5 + 6 + 3 = 4 kN.

SF at C = +4 kN

SF at A = +4 kN

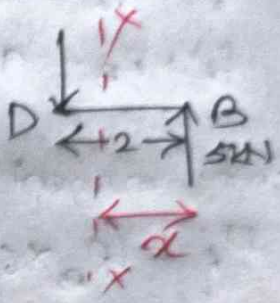


BM at DB

BM at XX = $(R_B \times \alpha)$

If $\alpha = 0$, $BM_B = 0$

If $\alpha = 2$, $BM_D = 5 \times 2 = +10$ kNm

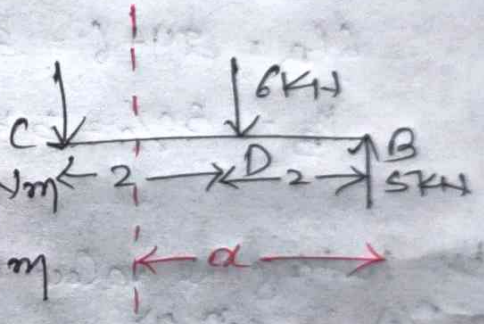


BM at CD

BM at XX = $(R_B \times \alpha) - (6 \times (\alpha - 2))$

at $\alpha = 2$, $BM_D = (5 \times 2) - (0) = 10$ kNm

If $\alpha = 4$, $BM_C = 20 - (12) = 8$ kNm



BM at AC

BM at XX = $R_B\alpha - (6 \times (\alpha - 2)) - (3 \times (\alpha - 4))$

If $\alpha = 4$, $BM_C = (5 \times 4) - (6 \times 2) - (3 \times 0)$

$= 20 - 12 = 8$ kNm

If $\alpha = 6$, $BM_A = (5 \times 6) - (6 \times 4) - 3(2)$

$= 30 - (24 + 6) = 0$